Experiment -6

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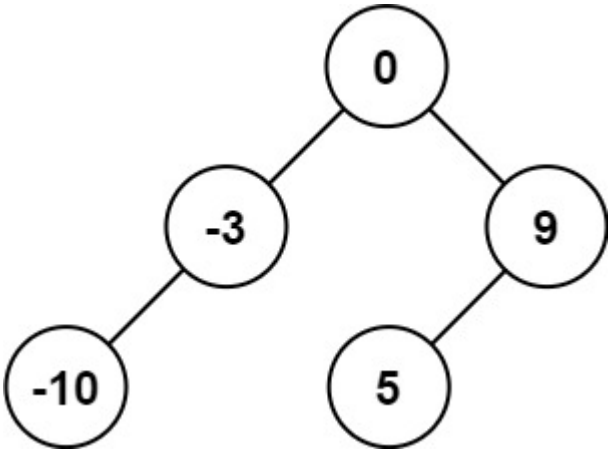
Subject: Advanced Programming-II **Subject Code:22CSP-351**

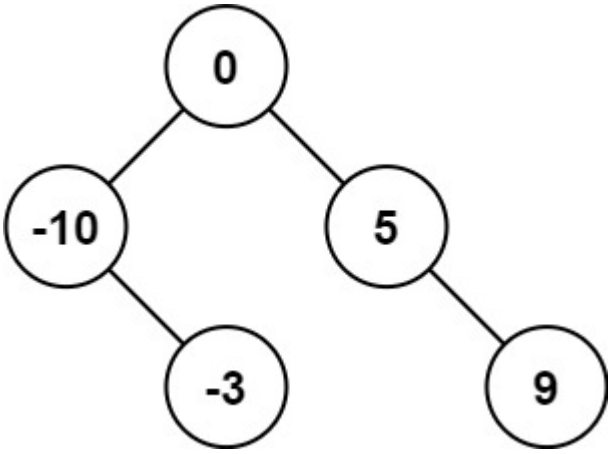
Problem-1: Convert Sorted Array to Binary Search Tree

Given an integer array nums where the elements are sorted in ascending order, convert it to a height-balanced binary search tree.

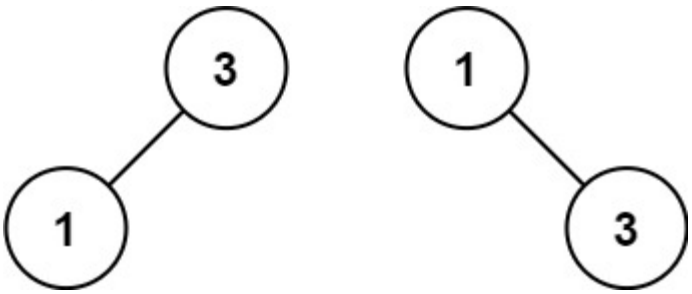
Example 1:



Input: nums = [-10,-3,0,5,9]
Output: [0,-3,9,-10,null,5]
Explanation: [0,-10,5,null,-3,null,9] is also accepted:



Example 2:



Input: nums = [1,3]
Output: [3,1]
Explanation: [1,null,3] and [3,1] are both height-balanced BSTs.

Constraints:

- 1 <= nums.length <= 10^4
- -10^4 <= nums[i] <= 10^4
- nums is sorted in a **strictly increasing** order.

Code

C++ Auto

```
* struct TreeNode {
*     int val;
*     TreeNode *left;
*     TreeNode *right;
*     TreeNode() : val(0), left(nullptr), right(nullptr) {}
*     TreeNode(int x) : val(x), left(nullptr), right(nullptr) {}
*     TreeNode(int x, TreeNode *left, TreeNode *right) : val(x), left(left), right(right)
{}
* };
*/
class Solution {
public:
    TreeNode* sortedArrayToBST(vector<int>& nums) {
    return helper(nums, 0, nums.size() - 1);
    }

private:
    TreeNode* helper(vector<int>& nums, int left, int right) {
        if (left > right) return nullptr;
        int mid = left + (right - left) / 2;
        TreeNode* root = new TreeNode(nums[mid]);
        root->left = helper(nums, left, mid - 1);
        root->right = helper(nums, mid + 1, right);
        return root;}

};
```

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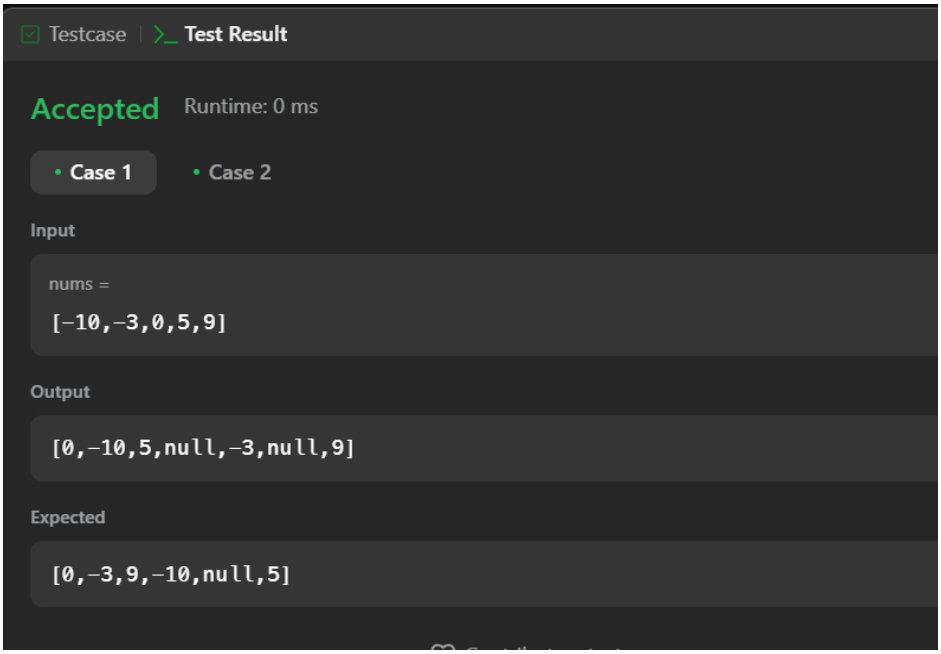
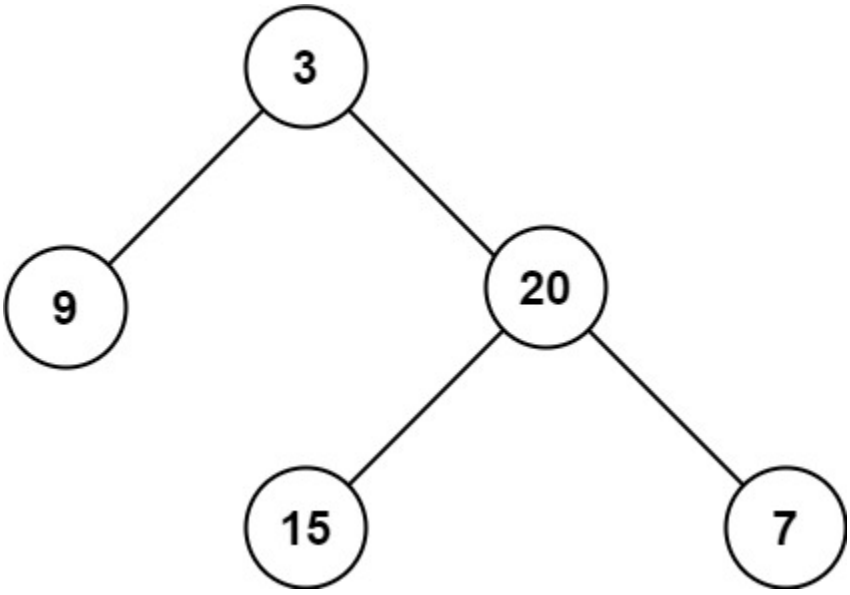


Problem-2: Maximum Depth of Binary Tree

Given the root of a binary tree, return *its maximum depth*.

A binary tree's **maximum depth** is the number of nodes along the longest path from the root node down to the farthest leaf node.

Example 1:



Input: root = [3,9,20,null,null,15,7]

Output: 3

Example 2:

Input: root = [1,null,2]

Output: 2

Constraints:

- The number of nodes in the tree is in the range [0, 10^4].
- -100 <= Node.val <= 100

Code

C++ Auto

```cpp
/**
 * Definition for a binary tree node.
 * struct TreeNode {
 *     int val;
 *     TreeNode *left;
 *     TreeNode *right;
 *     TreeNode() : val(0), left(nullptr), right(nullptr) {}
 *     TreeNode(int x) : val(x), left(nullptr), right(nullptr) {}
 *     TreeNode(int x, TreeNode *left, TreeNode *right) : val(x), left(left), right(right) {}
 * };
 */
class Solution {
public:
    int maxDepth(TreeNode* root) {
        if (!root) return 0;
        return 1 + max(maxDepth(root->left), maxDepth(root->right));
    }
};
```

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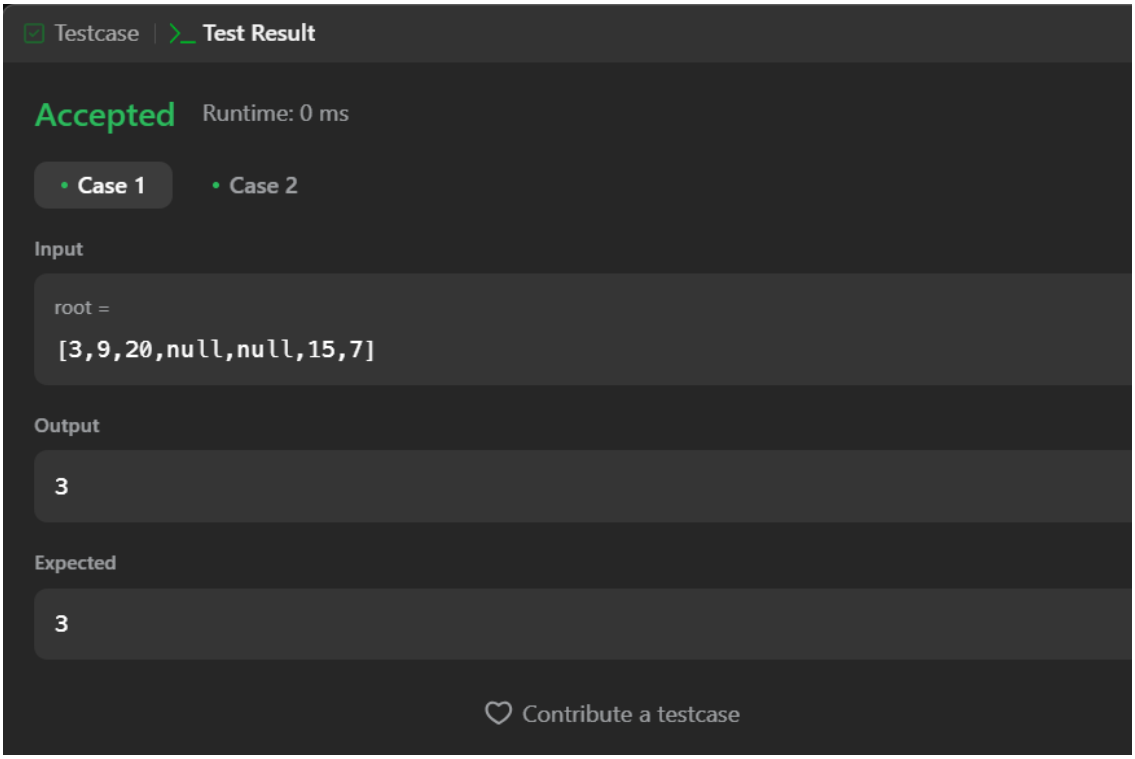
Testcase
Test Result
Accepted
Runtime: 0 ms
Case 1
Case 2
Input
root =
[3,9,20,null,null,15,7]
Output
3
Expected
3
Contribute a testcase